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High selectivity production of aldehyde(s) using hydroformylation reaction - comprises reacting olefin(s) with carbon monoxide and hydrogen in presence of catalysts containing metals of group eight and cyclic phosphonite compounds

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Production of aldehydes (I) using a hydroformylation reaction comprises reacting olefin compounds with carbon monoxide and hydrogen in the presence of catalysts containing metals of the eighth group, and tri-valent organic phosphorus compound of cyclic phosphonite compounds.

MORE SPECIFICALLY

The cyclic phosphonite compounds are e.g. of formula (IIa) or (IIb).

E(10-D1C) N(2, 5-D, 5-E1)

 X_2 , Y_2 = optionally substituted di-valent hydrocarbon group;

 Q_2 , Q_3 = optionally substituted methylene;

m, n = 0, 1 or more; and

 X_3 , Y_3 , Z_2 , Z_3 = optionally substituted hydrocarbon group.

ADVANTAGE

(I) can be prepared with high selectivity and less reduction of the olefin compounds.

PREFERRED MATERIALS

The olefin compounds are ethylene, propylene, butene, butadiene,

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and/or pentene. The group 8 metal is Rh.

EXAMPLE

Propylene (4.50 g) was reacted with H₂/CO gas at 70 °C for 10.0 hours in the presence of carbonyl complex compound of formula (IV) (39.4 g), and phosphonite compound of formula (II') (1.0 mole per mole of Rh) to give 100% aldehyde. (MHG)

 $|Rh(OAc)(COD)|_2$ (IV)

COD = cyclooctadiene.

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